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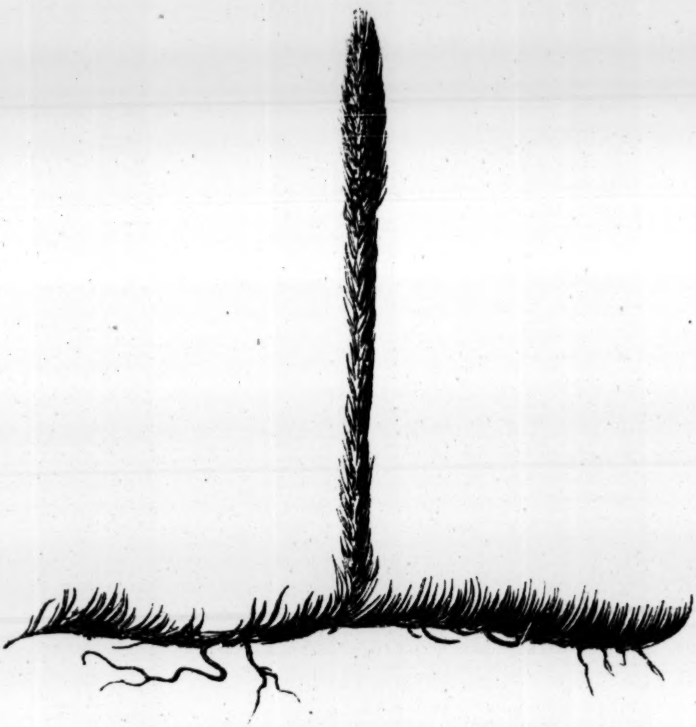
ART. XIX.—*A History of the British Lycopodia, and allied Genera.*

By EDWARD NEWMAN. (Continued from page 36).



THE MARSH CLUB-MOSS.

LYCOPODIUM INUNDATUM of Authors.

LOCALITIES.

England. Cambridgeshire; Gamlingay Heath, *Messrs. Isaac Brown, A. Wallis and T. Sansom.* Cumberland; Wastewater, *Mr. S. P. Woodward.* Devonshire; Trentishoe bog, near Linton, *Mr. Ward.* Kent; near Bromley, *Mr. S. P. Woodward:* Keston Heath, *Mr. W. Pamplin:* Ham Ponds, near Sandwich, *Mr. Ward.* Lancashire; near Manchester, *Mr. T. Sansom.* Middlesex; Hampstead and Bagshot Heaths, *Ray.* Norfolk; not unfrequent on wet heaths; Moushold Heath, Stratton Strawless, Horsfield, Felthorpe and Holt Laws, *Mr. S. P. Woodward.* Surrey; near Esher, *Mr. S. P. Woodward:* Oxshot Common, *Mr. Cameron:* Leith Hill Common, *Mr. Sansom:* Woking Common, *Mr. Luxford:* Reigate Heath, 1841, *Mr. J. A. Brewer:* Wimbledon Common, Shirley Common, *Mr. W. Pamplin.* Sussex; Tilgate Forest, *Mr. H. M. Holman.* Warwickshire; Coleshill Heath, *Rev. W. T. Bree.* Yorkshire; near Settle, *Mr. S. P. Woodward.*

Scotland. Nairnshire, on moist heathy ground, near Cawdor; *Drs. Balfour and Greville:* Cawdor Woods; *Mr. W. A. Stables.*

Wales and Ireland. Unrecorded.

The Marsh Club-moss appears to occur, although not abundantly, on most of the heaths and commons in the south of England, particularly where turf has been pared from the surface. In the immediate neighbourhood of London many habitats have been recorded; those given above I have had opportunities of verifying. In the midland and northern counties it is less common; in Scotland and Wales it is of comparatively rare occurrence; and in Ireland it is altogether unknown. It is found on wet or turfy ground, generally preferring a sandy or gravelly soil: its non-appearance in Ireland appears unaccountable.

Our early botanists were not generally acquainted with this species. It is described and figured by Vaillant and Dillenius, but the latter author has given it a branched and luxuriant appearance which I have never seen it assume. Tragus and Gerarde do not mention the plant, and although Plukenet and Morison have been quoted as authorities, I much doubt the correctness of the references. Its medical virtues have not been recorded.

The marsh club-moss is an insignificant and by no means striking plant. In its foliage and solitary spike it more nearly resembles Lycopodium clavatum than any other British species; but the nearly circular capsule and other distinguishing characters separate it widely from that, and indeed from all the other indigenous Lycopodia.

The roots are stout; they do not penetrate the earth so deeply as those of either of the species previously described: the prostrate stem creeps close to the soil, and is occasionally, but rarely, branched, the branches still remaining prostrate; the stem appears to be of slow growth, and never increases in size in the same way as that of the species before described; between the points where it is attached by the roots, the stem sometimes assumes an arched appearance.

The growth of each year, with the exception of its extreme point (which remains firmly rooted to the ground), dies during the succeeding winter; the dead portion for some months adhering to the soil, and even after decay leaving a conspicuous black line on the surface. In the autumn each plant throws out an erect solitary spike, situated on a foot-stalk which usually rather exceeds the spike itself in length.

Every part of the plant is densely clothed with linear acute leaves; those on the prostrate stem are invariably curved upwards; on the footstalk they are rather more scattered, erect and without curvature. The leaves or bracts on the spike differ from the others in being broader at the base, and are not unfrequently furnished with a single tooth on each side. The capsules are situated at the base of the bracts; they are nearly spherical, and of a pale yellowish green colour.

In my observations on the supposed uses of Lycopodium clavatum a ludicrous blunder occurs. I have surmised that Lightfoot, whose 'Flora Scotica' was published in 1777, borrowed an idea from Wahlenberg, who wrote in 1826. The name of Mattegras is of old date, so that the reasoning of the passage is still sound.

EDWARD NEWMAN.

ART. XX.—*Additions to Luxford's 'Reigate Flora.'* Communicated by H. M. HOLMAN, Esq.

18, St. Thomas's St. East, August 12, 1841.

SIR,

The following plants have been detected in the neighbourhood of Reigate, by various observers, since the publication of the 'Reigate Flora' in 1838. If you think the list possesses sufficient interest to be printed, it is quite at your service.

Yours, &c.
H. M. HOLMAN.

To the Editor of 'The Phytologist.'

Hippuris vulgaris. Plentiful in the mill-pond at Leatherhead.

Lemna trisulca. Castle-moat.

Scirpus fluitans. Pools on Earlswood Common.

Eriophorum vaginatum. Leith Hill, plentiful.

Milium effusum. Plentiful in a copse to the right of the foot-path leading from Rice Bridge to Gadbrook: lane leading from Reigate Heath to Colley Hill.

Aira flexuosa. Redstone Hill, near Mespilus germanica: on Reigate Heath, in Chart Lane, &c.; common.

Poa nemoralis. On both banks of the lane leading from Cockshot Hill to Gander's Hall.

Triodia decumbens. Redhill.

Festuca bromoides. About Redhill.

Bromus secalinus. Corn-fields between Merstham and Coulsdon.

Avena pubescens. Very abundant at the foot of Reigate Hill.

Dipsacus pilosus. Right hand of the road from Wonham Mill to Betchworth; 1841. Norbury Park.

Centunculus minimus. Abundant on Reigate Heath.

Potamogeton pectinatus. Pond in a copse at the foot of Reigate Hill.

Cynoglossum sylvaticum. Hedges left of the road between the Burford Inn and the Running Horses, Mickleham; also plentiful in Norbury Park.

Hottonia palustris. Ditches at Burstow.

Campanula latifolia. A considerable quantity in a copse on High Trees Farm.

Rhamnus catharticus. Hedges at the foot of Reigate Hill and Colley Hill.

Cuscuta Europœa. Banks of the Mole between Mickleham and Leatherhead, on nettles and mallows.

Bupleurum rotundifolium. Two specimens in a barley-field on the High Trees Farm, 1838: field near the Hermitage on Buckland Hill, 1841.

Œnanthe fistulosa. Plentiful in Merstham pools.

Galanthus nivalis. Extremely plentiful in a field near the farm-house at Whiggey: banks of the Mole at Brockham.

Narcissus Pseudo-narcissus. Meadow near Horley mill.

——— *biflorus.* Meadow right hand of the London road beyond the tunnel; and at Flanchford.

Lilium Martagon. Copse between Mickleham and Headley.

Ornithogalum nutans. Plentiful on the bank right of the lane leading from Linkfield Street to Wray Common.

Luzula Forsteri. Wood by the fullers' earth pits at Nutfield.

Triglochin palustre. Nutfield Marsh.

Daphne Laureola. Nutfield: Merstham: and in a wood behind Juniper Hall, Mickleham.

Polygonum Bistorta. At Nutfield and Flanchford.

Sedum reflexum. By the side of the London road, at Kingswood.

Pyrus Aucuparia. Redstone Hill.

Fragaria elatior. Fridley Copse.

Helleborus viridis. A considerable quantity on Reigate Hill, near the east end of the hedge-row on the north side of the field opposite the Gatton Inn: also in Fridley Copse, near Mickleham.

——— *fœtidus.* Foot of Mickleham Downs.

Lathyrus sylvestris. Abundant on the chalk hills, between Merstham and Coulsdon.

Astragalus glycyphyllos. Abundant on the chalk hills between Merstham and Coulsdon.

Trifolium subterraneum. Plentiful on Redhill; Wray Common; and Reigate Heath.

——— *striatum.* Plentiful on the Park Hill; Wray Common; and in a field by Blackboro' Mill.

Cnicus pratensis. Bog between Pease-pottage gate and Starve-mouse plain, Tilgate Forest, Sussex.

Petasites vulgaris. Betchworth: and plentiful on the right hand side of the London Road, about 100 yards beyond the Feathers Inn, Merstham.

Thrincia hirta. Earlswood Common.

Typha angustifolia. Pool at Merstham.

Mercurialis annua. By the ruins of Betchworth Castle.

Euphorbia platyphylla. Field near the Hermitage, on Buckland Hill.

Aspidium angulare. Plentiful in Chart Lane.

Lycopodium Selago. Leith Hill.

Pilularia globulifera. Below New Pond, on Earlswood Common.

Phascum crispum. Redstone Hill.

——— *subulatum.*

——— *curvicollum.* Bank by the side of the Brighton road, between Crawley and Handcross.

Sphagnum obtusifolium, *squarrosum*, and *acutifolium.* Bogs on Reigate Heath.

Gymnostomum truncatulum. Banks about Redhill.

——— *pyriforme.* Clover field at Meadhole.

Polytrichum undulatum. Banks, common.

——— *piliferum.* Reigate Heath.

——— *juniperinum.* Redhill and Reigate Heath.

——— *commune.* Reigate Heath.

——— *aloides.* Shady banks.

——— *nanum.* Reigate Heath.

Tortula muralis. Walls, common.

——— *ruralis.* Roofs of old buildings, and on walls.

——— *subulata.* Moist banks, common.

——— *unguiculata.*

——— *fallax.* Common.

Grimmia apocarpa. Walls of the Vicarage garden.

——— *pulvinata.* Walls, common.

Weissia cirrata. Old palings.

Weissia curvirostra. On old palings.

——— *controversa.* Banks, abundant.

Dicranum bryoides. Moist banks, freqnt.

——— *taxifolium.* Side of a ditch on Wray Common; lane behind the park.

——— *glaucum.* Reigate Heath, abundant.

——— *flexuosum.* Lane west of the Park.

——— *scoparium* and *heteromallum.* Common.

Didymodon purpureum. Reigate Heath and Redhill.

Funaria hygrometrica. Reigate Heath, and on walls.

Orthotrichum anomalum and *affine.* On trunks of trees, common.

——— *striatum* and *Lyellii.* Gatton wood, on trees.

——— *crispum.* Beeches on Reigate Hill.

——— *pulchellum.* Rather plentiful on the beeches on Reigate Hill.

Neckera crispa. In the greatest profusion on the stumps of hawthorns on Buckland Hill; and amongst the juniper-bushes on Reigate Hill.

Anomodon viticulosum. Reigate Hill; and frequent on stumps of trees.

Daltonia heteromalla. Common on trunks of trees.

Fontinalis antipyretica. Very fine in a pool near the Church.

Bartramia pomiformis. Lane behind the Park; high bank at Buckland.

——— *fontana.* Reigate Heath, barren; in fruit at Redhill.

Hypnum complanatum. Trees, common.

——— *undulatum.* Stump of a tree in the lane west of the Park.

Hypnum serpens. Banks, frequent.

——— *Schreberi.* Wray Common and Reigate Hill.

——— *purum.* Common.

——— *sericeum.* Trees and walls, com.

——— *lutescens.* Reigate Hill.

——— *alopecurum.* Banks, frequent.

——— *dendroides.* Nutfield Marsh.

——— *curvatum.* Gatton woods, freqnt.

——— *splendens.* Reigate Heath, &c.

——— *proliferum.* Banks, common.

——— *prælongum.* Common.

——— *abietinum.* Reigate Hill, among Neckera crispa and Hypnum lutescens.

——— *piliferum.* Banks.

——— *rutabulum, velutinum, confertum* and *striatum.* Common.

——— *cuspidatum.* Reigate Heath.

——— *triquetrum* & *squarrosum.* Common.

——— *palustre.* Redhill.

——— *aduncum.* In great profusion in bogs on Reigate Heath.

——— *cupressiforme.* Common.

——— *molluscum.* Reigate Hill.

Bryum palustre. Reigate Heath; rarely in fruit.

——— *pyriforme.* Sand-bank near Dorking.

——— *argenteum.* Walls and banks, freq.

——— *roseum.* Lane west of the Park; and Reigate Heath.

——— *capillare* and *cæspititium.* Walls and roofs.

——— *ligulatum.* In fruit at Buckland, 1839 and 1840.

——— *hornum.* Banks, frequent.

——— *cuspidatum.* Banks, frequent, always barren.

Additional localities for some of the rarer plants of the Reigate Flora; the figures refer to the pages of that work in which the plants are recorded.

Iris fœtidissima, 5. Copse on right hand of the lane leading from Reigate Heath to Colley Hill.

Scirpus lacustris, 5. Pond at Frenches.

Arundo Phragmites, 10. Pond left of the lane leading from Reigate Heath to Colley Hill: pond in Gatton Park.

Lithospermum officinale, 16. Field left hand of the lane leading from Reigate Heath to Wonham Mill: copse on Brightam's Farm, Wray Common.

Anagallis cærulea, 17. High Trees Farm.

Hyoscyamus niger, 19. Redhill, abundant.

Myosurus minimus, 29. Cornfields at Flanchford and Santon.

Polygonum dumetorum, 35, 91. Hedge left hand of the lane leading from Redhill to Turner's Croft; plentiful in 1839.

Chrysosplenium alternifolium, 38. Bog near the Somers Arms, Redhill; and at Littleton.

Ajuga Chamæpitys, 50. Plentiful on Buckland Hill, 1838.

Lathræa squamaria, 54. Very abundant in Fridley Copse, near Mickleham.

Lathyrus Nissolia, 63. Field on Colley Farm.

Orchis Morio, 74. Pastures on High Trees Farm.

Epipactis purpurata, 77. Wood on the top of Colley Hill: and in Gatton Wood.

——— *palustris*, 77. Amongst the willows below Merstham Pools.

Lycopodium inundatum, 88. Reigate Heath, by the bog nearest the Dorking road.

Art. XXI. — *Descriptions of two new Orchidaceous Plants from Para*. By Frederick Westcott, Esq., A.L.S., Honorary Secretary to the Birmingham Botanical and Horticultural Society.

The two new plants described below are natives of Para, where they were collected by S. Dickinson, Esq. in the year 1839, and transmitted by him to George Barker, Esq. in whose extensive collection at Springfield, near Birmingham, they flowered during the present spring.

Nat. Order.—Orchidaceæ. Tribe.—Malaxideæ, *Lindl.*
Genus.—Pleurothallis, *R. Br.*

Pleur. barbata. Foliis lanceolatis, ovatis, apiculatis: sepalis subæqualibus, patentibus, lateralibus reflexis, basi connatis, supremo subreflexo; petalis sepalis multò minoribus, subciliatis, acutis; labello integerrimo, linguæformi, medio incurvo, apice acuto, carnoso, recurvo, suprà glabro, subtùs barbato.

Plant about 3 inches high. Stem smooth, angular, with 2 entire sheaths. Leaves fleshy, smooth, keeled, the keel terminating below the apex and producing a point, the older leaves have their margin more or less recurved. Flowers minute, racemose, varying in number from two to many, as would appear from examining the old scapes. Sepals rather ovate-lanceolate, smooth, rather obtuse, the lateral ones combined from the base half way up, then free; colour purple, except at the base, and if examined with a glass of moderate magnifying power, they present a pretty papillose appearance. Petals much smaller than the sepals, rather ciliate, acute, or perhaps approaching to acuminate. Labellum entire and strongly bearded beneath, incurved in the middle; apex fleshy, acuminate, reflexed, and in colour similar to the sepals and petals. Column smooth, about half the length of the petals, tipped with purple at the back near the apex. Clinandrium slightly laciniate. Stigmatic cavity ovate. Pollen-masses 2, pear-shaped. Anther-case smooth, 1-celled.

The flowers are very small, but singularly pretty if examined with a magnifier of moderate power.

Tribe.—**Vandeæ**, *Lindl.*
Genus.—**Notylia**, *Lindl.*

Not. laxiflora. Labello unguiculato, ecalloso, cordiformi, acuminato: perianthiis subæqualibus: petalis subacuminatis, 2- vel 3-punctatis: sepalis lateralibus coalitis, apice emarginatis subrevolutis.

Pseudobulbs small, about 6 lines high, furrowed. Sheaths scarious, longer than the pseudobulbs. Leaves ovate-lanceolate, fleshy, apiculate, revolute, 2 inches long and about 1 inch broad. Scape 6 inches long, inflorescence spreading. Peduncles about 4 lines long. Bracts ovate, acuminate, about one fourth the length of the peduncle. Petals rather shorter than the sepals, acuminate, of a pale yellowish white colour, marked near the base with two or three orange-coloured spots. Sepals of a yellowish green colour, upper one acuminate, the lateral ones combined from the base to the apex, where there is a notch, apex slightly recurved. Labellum small, unguiculate, the base of the lamina is heart-shaped, and of a yellowish colour. Column straight, about the length of the labellum, and in colour similar to the petals. Ovarium about one-third the length of the peduncle, furrowed.

Birmingham, April 16, 1841. **Fred. Westcott.**

Art. XXII.—*Analytical Notice of the 'Transactions of the Linnean Society of London,' vol.* xviii. *pt.* 4. *August*, 1841.

The 18th volume of the Linnean Transactions is just completed by the publication of the 4th part. Ten of the papers out of the fourteen contained in this part are botanical; and of such of these as may be considered most interesting to the British botanist, we intend to give as full an analysis as our limits will allow.

Art. XXX. — *Observations on the Structure and Development of the Organs of* Pilularia globulifera. *In a Letter to* R. H. Solly, Esq., F.R.S. and L.S. By William Valentine, Esq., F.L.S.

Mr. Valentine, already well known by his papers 'On the development of the Theca, and on the sexes of Mosses,'* and 'On the existence of Stomata in Mosses,'† has in the article before us recorded the results of his investigations on the structure and economy of an interesting British plant, of rather unfrequent occurrence. We do not strictly observe the order adopted by the author in treating on the various parts of the subject, but however, like him, we begin with the sporules.

The involucrum of Pilularia globulifera contains two kinds of bodies occupying distinct sacs. The first kind are found chiefly but not exclusively in the upper part of the involucrum; they are round, not more than the 460th of an inch (in diameter?) and about forty in each sac: these bodies have been called pollen by some botanists and anthers by others, but the author proves Dr. Lindley's conjecture that they are abortive sporules, to be perfectly correct. The second kind are of an oblong pyriform shape, slightly constricted in the middle, with a more or less plicate conical projection at one end; these are far less numerous than the first kind, and occur singly in each sac; they are about the 60th of an inch broad, and have the power of germinating, which the first kind do not appear to possess. The author considers these larger bodies to be "undoubted sporules;" each of them consists of three coats, and the interior is occupied by a grumous fluid and particles of matter of various sizes and mostly ovate figure. The conical projection of the sporule is a prolongation of the middle coat, and is perforated at the apex: the inner coat is not continued into the cone, but on the removal of that part may be seen closing the aperture, in the form of a transparent membrane marked with three lines radiating from the centre, which indicate a valvular structure.

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* 'Trans. Linn. Soc.' xvii. 465.

† Id. xviii. 239.

The progress of development of these sporular bodies is minutely detailed, and illustrated by a number of beautifully executed figures.

> "A transverse section of the involucrum, when about the size of a small pin's head, shows it to consist of four integuments containing a mass of very delicate, spongy, compressible, cellular tissue, subdivided into four equal triangular portions, by four lines radiating from the centre."—488.

In the centre of each of the four triangular portions is a cavity, into which projects a number of nipple-like processes attached to a common receptacle. As the involucrum advances the cavities increase in size by a gradual recession of the surrounding cellular tissue, caused by an inherent condensation, of which the four radiating lines are the result; and at maturity this condensation "is so complete, that the whole of the spongy tissue is condensed into four dissepiments, dividing the cavity of the involucrum into four equal loculi." The nipple-like processes continue to increase in size, and on examination are found to be hollow sacs, each containing a quantity of grumous matter, and "about ten soft, rather opaque, pulpy bodies, which are evidently compounded of four closely connected parts, so placed on each other as to form a cone with a triangular base." Such of these bodies as occupy chiefly the upper portion of the involucrum,—

> "Enlarge, become pellucid, and recede from each other, but continue to be attached to each other by four stalks as long as half their diameter, which meet in one centre. It is now evident that these four bodies or sporules are contained in a mother-cell, which most probably existed before, but on account of its close approximation

> to the four united sporules could not be seen. On the surface of each of these sporules are three short lines, which radiate from the insertion of the stalk."—489.

After a time the mother-cell is ruptured, the sporules separate from each other at the centre where the stalks meet, so that each is at first furnished with a short tail, which soon disappears. These sporules at length become perfectly opaque and white, by the gradual deposition of matter on the outer surface, and then they contain a little grumous matter, having previously been quite empty. The mother-cell entirely disappears, but the author is "inclined to think that a portion of it becomes attached to the surface of each of the sporules, of which there are about forty in each sac." After arriving at this stage no further change appears to take place.

Up to the time of their becoming pellucid and receding from each other, the sporules in the lower part of the involucrum are developed in precisely the same manner as those in the upper, but here the analogy ceases. At this period, instead of the mother-cell being broken up and disappearing while the sporules remain entire, the greater number of the sporules themselves are ruptured and the unchanged mother-cell continues to envelope them.

> "The shrivelled remains of the ruptured sporules continue to be attached to each other by their stalks, and the mother-cell remains perfect; in short no further change takes place, for they may be found in this state in the same sac with the ripe sporules. The two or three unruptured sporules which are single in each union * * enlarge, each struggling for the mastery, and it is not long before one prevails, the smaller ones rupturing and passing into the same state as those first ruptured. The sole remaining sporule now enlarges rapidly, assumes a pyriform shape, and the mother-cell gradually recedes from it by a still more rapid enlargement, except around the narrow extremity to which the three ruptured sporules which form the union are attached, where the mother-cell has contracted an adhesion. It appears that this dilatation of the mother-cell is caused by a secretion of fluid between it and the sporule, for if the cell be punctured the fluid will escape, and the cell return by its elasticity to the same dimensions as the sporule."—p. 490.

This stage is marked by the disappearance of the three ruptured sporules, which till now had remained attached to the growing one: the author conjectures that they may escape by an aperture in the mother-cell, which is visible at a later period. A deposition of opaque matter on the mother-cell now takes place, and forms the outer coat of the sporule; and —

> "When the outer coat is completely formed, the mother-cell or middle coat ceases to enlarge, whilst the inner sac or true sporule continues its growth until it is checked by coming in contact with the inner surface of the mother-cell, to which, in its mature state, it is firmly adherent. The sporule is at first perfectly pellucid and deficient of

all granular contents; it is not till after the addition of the outer coat that the grumous granular matter is secreted."—491.

The germination of the sporules is minutely described by the author.

"The first external sign of germination is either the appearance of four cells projecting through the apex of the conical projection, or a gradual swelling of that part. * * The enlarging cellular mass then distends the conical projection, unfolding the plicæ of that body, and at length appears externally with four of its cells projecting beyond the general mass, and compressed into a quadrangular form. * * Soon after the exposure of the entire germ, which is effected by the reflection of the valves [of the internal membrane] and conical membrane over the side of the sporule, where they lie quite concealed by the germ, little fibrillæ or rootlets begin to shoot from one side. They are simply articulated tubes, or elongated cells applied end to end, with frequently a bulbous extremity; and each is produced from one of the cells of the germ."—485.

Shortly after the appearance of these rootlets the cells of the germ become flatter and more intimately connected with each other; and at the same time that part of the germ which closes the cavity of the sporule becomes hollow, and afterwards points in two places. These points gradually lengthen, and on dissection each will be found to consist of a closed sheath, one containing the first leaf and the other a root: these two apparently distinct sheaths communicate with each other, and envelope nearly the whole of the germ. The young leaf, when rather longer than the sporule, bursts through its sheath, and the root protrudes before it is as long as the sporule.

"After the leaf has grown to be many times the length of the sporule, or about two lines long, another leaf grows from the germ close to the first, to which it is in all respects similar; and then a bud begins to be developed from some indefinite part of the germ, but like the leaves and root, from within the sheath, which is now frequently much lacerated. This bud is covered by a peculiar kind of jointed hairs, whose attachments are lateral, at a short distance from their bases, and which contain a few colourless granules. This bud sometimes appears after the first leaf, in which case there is no second primordial leaf formed; and is the rudimentary stem, the first growth from it being a leaf, which exhibits, although in a small degree, the first evidence of gyration, and shortly after a root, which is furnished with its own sheath. * * The roots are all formed in sheaths, through the apices of which they ultimately burst, the sheath continuing to embrace the base of the root, whilst a distinct and far more delicate sheath closely embraces its point."—487.

"This account of Pilularia shows that it is incorrect to say of Acrogens that 'germination takes place at no fixed point, but on any part of the surface of the spores;' for it is quite certain in this instance that germination invariably takes place at a fixed spot, which may be pointed out before germination has commenced. It is at that part of the sporule indicated by the three radiating lines which appear to have been produced by the pressure of the three other sporules that originally helped to constitute the quaternary union; and as the spores of all the other tribes appear, according to Mohl, to be developed in similar unions, it is most probable that similar lines indicating a valvular dehiscence also exist on them. This is certainly the case in some mosses, for instance, in Œdipodium, and in Isoëtes, Lycopodium, and Osmunda regalis; and in those instances where such a structure is not visible, it is probably owing to a thickening of the membrane, or a deposition of opaque matter on its surface, as in Pilularia. In the mature sporules of Pilularia they can only be discovered by dissection, and in the abortive ones they cannot be discovered at all after the first stages of their growth; whilst, again, the sporules of Jungermannia complanata exhibit similar lines after they have been submitted to the action of sulphuric acid. After the protrusion of the germ, however, it does appear to be quite immaterial from what part of the germ the first leaves, root or stem shall arise.

"It is almost superfluous to point out, that these primordial leaves, if the sporules be considered as seeds, have no analogy, except in their use, with cotyledons, because true cotyledons pre-exist in the seed, whereas these are the product of germination. But according to the view of the nature of sporules which I have endeavoured to establish, Pilularia must be considered as nearly allied to monocotyledons in its germination. * * I shall conclude these observations by stating that I have not been able to detect any organs which, as in the mosses, can by any possibility be supposed to perform the office of impregnating the sporules."—492.

ART. XXXI. — *Supplementary Observations on the Development of the Theca, and on the Sexes of Mosses. In a Letter to* R. H. SOLLY, Esq., F.R.S. and L.S. By WILLIAM VALENTINE, Esq., F.L.S.

THE author commences his letter by observing that subsequent examination of mosses leads him to concur in Mohl's views with regard to the fourfold development of sporules in a mother-cell, a fact of which he had expressed some doubt in a note appended to his paper 'On the development of the Theca, and on the Sexes of Mosses,' in 'Trans. Lin. Soc.' xvii. 481. He says he now feels himself "bound to confirm the accuracy of Mohl's observation in this respect:" and then proceeds to give a detailed account of the structure of the theca, and of the development and tetrahedral union of the sporules, as observed by himself in Œdipodium Griffithianum, a moss found plentifully on Snowdon, and examined in a recent state.

From these observations it appears that like those of Pilularia, the four sporules of Œdipodium are piled on each other in the mother-cell, "so as to form a cone with a triangular base;" like them, also, the four are connected with each other, when young, by a "very minute stalk, situated at the junction of three radiating lines." The author has "observed several instances in which the mother-cell contained but one sporule, which was in all the cases round, and did not exhibit any signs of a stalk, or of radiating lines on its surface."

The following observations on the analogy subsisting between thecæ and anthers, and on that between sporules and pollen, which the author evidently considers to be essentially identical, are exceedingly interesting.

> "In the first place, the sporules are formed in thecæ which have a great resemblance to some anthers. They are in most instances surrounded by a perichætium, which is a collection of modified leaves analogous to the perianth. They are either sessile, or seated on a stalk or seta, which may be named the filament. In Sphagnum the theca is elevated on a pedicel or leafless prolongation of the axis, of which peculiarity the anther of Euphorbia is a parallel instance. The thecæ are one-celled, yet they have a columella, which may be likened to the connectivum; and although the connectivum usually divides the anther into two cells, Callitriche is an instance in which there is but one cell; and there are examples in which the cavity is spuriously divided into four cells, as in Tetratheca, which in this respect resembles the theca of Polytrichum; and in the fact of evacuating its contents by a single pore, resembles the general structure of thecæ. All thecæ are lined by a distinct membrane, and so nearly does this resemble the endothecium of an anther, that in Jungermannia multifida its tissue is fibrous. The remarkable manner of the development of sporules and pollen is a most convincing analogy; they are developed in unions of fours in the *cavities* of simple cellules; in fact, they are secretions in the cellules which occupy the interior of the theca or anther, and are the only instances on record within my knowledge, of organized secretions in the cavities of simple cellules. Although the tetrahedral union of both sporules and pollen is almost always dissolved at an early period, yet in some instances, as in Œdipodium and Erica Tetralix, it remains at maturity. Again, neither sporules nor pollen ever have the slightest apparent organic connexion with the parent plant,—a most remarkable coincidence, and a fact which has never been insisted on as a distinguishing character between sporules and seeds."—502.

The effects produced by the application of sulphuric acid to the sporules are next described; "the same phenomena occur as when it is applied to pollen." The author in a foot-note recommends this acid as "a valuable agent in the analysis of the peristomes of mosses," and thus concludes his valuable letter:—

> "Lastly, to complete the analogy, the sporules of mosses and of some other tribes commence their germination by the emission of the internal lining membrane in the form of a tube, which is exactly analogous to the pollen-tubes. In the mosses these tubes increase by the addition of a series of fresh tubes at their extremities, and at length a bud containing the rudiments of stem, leaves and roots is formed, which may be considered analogous to the embryo or young bud in the seed of the more highly organized plants."—506.

The beautifully engraved illustrations which accompany the paper, comprise figures of Œdipodium Griffithianum, both of the natural size and magnified, and highly magnified views of the sporules in various stages of development, of the theca, and other parts of that moss; and also figures exhibiting the effects of sulphuric acid on the sporules of Gymnostomum truncatulum, Orthotrichum striatum, and Jungermannia complanata.

(To be continued).

ART. XXIII.—*Varieties; Original and Select.*

21. *Cnicus Forsteri* I saw growing by hundreds last month in a piece of marshy ground formerly part of Ditton Common; at least it was the plant I previously found near Weybridge and sent to Sir W. Hooker. It was growing with various numbers of flowers from one up to four, each on a separate and generally a long stalk. On comparing it with the books both English and foreign, and especially with Decandolle's description of his Cirsium anglicum (our Cnicus pratensis), I have little doubt that it is merely a variety of that, and that C. Forsteri, as you suggested, has no existence as a species.—*J. S. Mill; Kensington, July* 13, 1841.

22. *Note on British Lycopodia.* From what I read in "The Phytologist" I am led to infer that any notice of fresh localities of our British Lycopodia, (especially in the Midland Counties, where these plants are comparatively rare), may not be entirely without interest. Three out of our six native species I have formerly found on Coleshill Heath (especially near Coleshill Pool), Warwickshire; viz. Lycopodium Selago, clavatum and inundatum;—all however, seem now to have disappeared; at least no one of the three have I been able to meet with at the above station for some years past. Many years ago, when quite a boy, and in company with my father, I remember to have seen a single plant of Lyc. Selago growing in the bog below the pool. This was the only specimen I ever saw, or heard of being found, in the neighbourhood; and as we gathered it, thinking it a prize, I suppose we put a finishing stroke to its existence in that situation. Lyc. clavatum was met with in some abundance. People knowing nothing of Botany were struck with the beauty of the plant, and used to gather long strings of it, hanging them in festoons round their looking-glasses and picture-frames, to adorn their rooms. I have failed to meet with the plant in its old quarters for some years, and I attribute its non-appearance to the growth of young plantations, the trees of which have overshadowed the ground, and in great measure destroyed the vegetation beneath. For the non-appearance now-a-days of Lyc. inundatum I am at a loss to account, because the parts where it grew (the shores of Coleshill pool), remain much in the same state as formerly, and would seem to be peculiarly suitable to the growth of the plant, being always moist, and occasionally overflowed. But after repeated searches in the very spots where it used to grow plentifully, I have for some years past failed to find it. A like fate, I may add, (though the fact has nothing to do with Botany), seems to have befallen the beautiful little Polyommatus Argus in the above district. We used to take it in great abundance: indeed, as a boy, I was more familiar with this species than with the common Pol. Alexis; but now we cannot find a single specimen. True it is Coleshill Heath has been greatly curtailed by inclosures and cultivation since the days I have alluded to; still however, considerable tracts yet remain *in statu quo:* the dryer parts purpled over with the three common kinds of heath, the bogs a sheet of gold in their season with the blossoms of Narthecium, and abounding with Oxycoccus, Comarum, Eriophorum, Menyanthes, &c., &c., but no Polyommatus Argus, no Lycopodium inundatum, so far as recent researches can discover.—*W. T. Bree*;* *Allesley Rectory, August* 12, 1841.

23. *New British Narcissus?* I have now for some years cultivated in the garden a very handsome daffodil, which was found wild by a friend of mine, near Tenby in Pembrokeshire, and is quite distinct from any other British Narcissus that I am acquainted with. The late Mr. Haworth, to whom I sent it in 1830, considered it new

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* In a letter to E. Newman.

to Britain, and recorded it in the 'Philosophical Magazine' under the name of Ajax lobularis. It is a highly ornamental species, a free flowerer, and increases readily. I think it may fairly be considered a native plant, (unless, indeed, it should be held to have been introduced by the Romans), for it is not likely that it should have been the outcast of a garden, being, as I believe, so little, if at all, known in the gardens, till of late years distributed by me among various private friends and public institutions, to all of whom it appears to have been previously unknown. The plant comes true from seed; the seedlings which I have raised differing very slightly, if at all, from the parent.—*Id.*

24. *Lilium Martagon.* This plant occurs in tolerable plenty near the village of Sampford, in this county [Essex], on the road from Great Bardfield to Walden. This locality was pointed out to me last May, by my relative Mr. R. M. Smith of Great Bardfield, who has known of it for above twenty years. The spot is a high bank, sprinkled with low bushes, on the side of a lane leading from the village eastward to some unexplored part of the county. From the situation I cannot at all suppose that the plant can be an escape from any garden. When I visited the spot there were a considerable number of plants, chiefly growing on the outsides of the clumps of bushes, but sometimes quite out in the grass. I do not see any mention of this locality in Ray's list of the rare plants of Essex, in Camden's Britannia, edit. 1695.—*Edward Doubleday; Epping, August* 12, 1841.

25. *Lilium Martagon.* I think I never shall forget the extreme pleasure I experienced when, in 1826, I first saw this beautiful plant growing in a little coppice to the right of the lane leading from Mickleham to Headley, in Surrey. The coppice was overshadowed by oak trees of considerable size, and the underwood had been cut during the previous year, so that the tall racemes of the lily stood up nobly and conspicuously above the brushwood, and it would have been difficult for any passing observer not to have noticed them.—*Edward Newman; August* 13, 1841.

[At the end of June, 1840, in a delightful excursion which we believe some of the party will not soon forget, we had the gratification of seeing Lilium Martagon growing in the greatest profusion in the station last mentioned. In some parts of the coppice the plants were so crowded that the flowers produced a perfect blaze of the richest colour among the young trees.—*Ed.*]

26. *Note on British Orchidaceæ.* From the commencement of the Birmingham Garden we have cultivated, with tolerable success, such of the British Orchidaceæ as we could obtain, and have preserved some species for several years without being obliged to procure a fresh supply from their native places of growth. They are grown in pots placed with our alpine plants; and about six years ago I was agreeably surprised at seeing some self-sown seedlings in several of the pots with the alpine plants, some of them being very small, and evidently seedlings of that year, others were much stronger. Of plants so obtained we have flowered several fine specimens every season for the last three years; some of them were permitted to flower where they came up, others were transplanted singly into pots, and all flowered equally well. They mostly are to be found with such alpine plants as have leaves covering the pots in winter in a living state, so as to ward off a portion of the rain, or in pots where the plants have a mass of roots to answer the same purpose, by absorption of the superabundant moisture. The species which have flowered from self-sown plants are Gymnadenia conopsea, Orchis maculata and O. latifolia,—the latter species being most abundant. As far as I can ascertain they flower the third year after their appearance in a seedling state.—*David Cameron; Botanic Garden, Birmingham, August* 15, 1841.

27. *Lycopodium clavatum* grows freely with us in a peat bed in a shaded situation, and appears as manageable as many other plants. Those who intend to cultivate it should, upon obtaining plants from their native habitat on the moors, put them into light sandy peat, and place the pots in a shaded situation until well rooted, when they may be turned out, with the balls entire, into a favourable situation, where they will require little further care or attention, except putting a little peat over some of the running stems to encourage them to make fresh roots.—*Id.*

28. *Lycopodium Selago* may also be grown in the same way as Lyc. clavatum, but does better in pots kept in a cool frame, or under a hand-glass, during the winter at least; it is also a plant well adapted for growing in the house, in a glass jar or glass case. Slugs are very fond of this species, and when once they commence will soon devour the whole plant if not sought out and destroyed.—*Id.*

29. *Dianthus plumarius* and *Dia. Caryophyllus.* The Dianthus plumarius from Ludlow Castle and D. Caryophyllus from Rochester Castle, cultivated together, besides the very satisfactory specific distinction presented by the different division of the petals and the serratures on the margins of the leaves, &c., have a different period for flowering; the flowers of D. plumarius appearing in June, while D. Caryophyllus only commences flowering at the latter end of July, and is now, in the middle of August, in perfection; the first corresponds in time of flowering with the garden pink, while the latter agrees with that of the carnation.—*Id.*

30. *Cibotium Baromez*, J. Smith. This interesting fern, which produced one fertile frond in the autumn of 1839, and of which a description by Mr. Westcott was read before the Linnean Society, February 18, 1840, has one fertile frond upon it this season. By some means or other a mistake has crept into the report of Mr. Westcott's description of this fern in the 'Proceedings of the Linnean Society,' Feb. 18, 1840, which perhaps had better be corrected. The passage I allude to is the following.—"Mr. Westcott is however in possession of a specimen of a fern collected in Mexico by Mr. Ross, which closely resembles the plant of the gardens, and should they prove to be identical, all doubt will be removed as to the claims of the present plant to be regarded as the *Baromez* of Linnæus, which is a native of China." The true state of the case is this. For want of a work containing the description of Cibotium, Mr. Westcott thought that in our fern he had detected a new genus; and he also found, among a lot of dried ferns from Mexico, a mutilated frond of a fern which would belong to the same genus, (this has since been tolerably well ascertained to be Cibotium Scheidei, *Chamisso*); and it was the *genus* he meant that had a wide range, extending from China to Mexico, but not the *species*, C. Baromez. Whether our plant really be the Baromez of Linnæus cannot be cleared up, as we are unable to trace out its native country; we however never had any reason for supposing it to be from America.—*Id.*

31. *Impatiens fulva.* From what I have heard of the circumstances under which Impatiens fulva occurs in the localities given in the last No. of the Phytologist (p. 40), I should hardly consider it entitled to a place in the British Flora. I have not visited the spot myself, but I learn from my friend Mr. Jenner, who is pretty well acquainted with the neighbourhood, that the plant is scarcely to be found on the banks of the stream *above* Albury. It is cultivated in the Albury gardens, whence the seeds are most probably carried down by the stream and deposited on its banks, where they vegetate, and the plant soon becomes established, its range being extended still lower in the same manner: it even occurs on the banks of the Thames, below the con-

fluence of the Wey. This Impatiens is also cultivated in Mr. Goulburn's gardens at Betchworth; and about a fortnight ago Mr. Henness and myself found plants of it growing on the banks of the Mole near Brockham, (below the gardens). I have no doubt that in a few years it will be carried down to Burford Bridge, and perhaps farther, and establish itself on the banks of the Mole as it has on the banks of the Wey near Albury.— *W. Hanson; Reigate, August* 16, 1841.

32. *Additional Guildford Stations.* Since the publication of the list of Guildford plants in the last number of 'The Phytologist,' Fumaria claviculata has been refound in its old locality, Martha's Chapel, and likewise on the extensive common near Shalford, called Blackheath. Epipactis latifolia has been found at the Sheepleas, and Cuscuta Europæa in an osier holt by the river Wey, a short distance above Guildford, entwined round nettles, the Spiræa Ulmaria, and the osiers themselves.—*J. S. Mill; Kensington, August* 24, 1841.

33. *Seeds of Aponogeton.* I write for the purpose of describing to you a rather singular phenomenon which I observed yesterday while committing to the water some seeds of the Aponogeton distachyon, and which you will probably have it in your power to notice. On their touching the surface, some of the seeds instantly began to move in starts and whirls, and had every appearance of living insects. On close observation I found that a considerable force (how produced is a mystery) was exerted to throw off what remained, after I had rubbed them, of the pithy matter from the pod which still adhered to them. As soon as they had rid themselves of this they sank. This is one of the most curious things I have ever seen.—*G. S. M. in Gardeners' Chronicle, August* 7, 1841.

ART. XXIV.—*Proceedings of Societies.*

BOTANICAL SOCIETY OF LONDON.

August 6.—D. Cooper, Esq., in the chair. Various donations to the Library, Herbarium and Museum, were announced. The Rev. George Munford exhibited specimens of *Aspidium cristatum*, collected by him at Bawsey Heath, near Lynn, Norfolk. Dr. John Lhotsky presented some interesting specimens of Australian woods. The following Papers were read:—"On the Botany of Western Norfolk," by The Rev. G. Munford. The geography of plants is of much interest to the botanist, and every attempt to promote the knowledge of this branch of the science is worthy of observation. It is now universally admitted that the geological character of every district exercises very great influence over its vegetation. By a reference to Woodward's Geological Map of Norfolk, published in 1833, it will be seen that proceeding eastward from Lynn, which is situated on the alluvium, we meet with a narrow strip of the Kimmeridge clay and oolite that runs in a direction north and south nearly the entire length of the district. This is followed by a much wider portion of the Carstone, running in the same direction; and parallel with this lies about the same quantity of chalk marle. The indentation of the eastern side of the district extends into the hard and medial chalk, but embraces only a small portion of the latter, towards the north. The Paper concluded with a very copious list of habitats. "On the differential characters of *Dianthus Caryophyllus* and *Dianthus plumarius*," by Mr. T. Sansom. "Descriptions of New *Algæ*, by Mr. Herring of Stuttgart," collected by Dr. Ferdinand Krauss during his travels, at Natal, South Africa. The paper was accompanied by a series of the specimens described. "On the supposed luminosity of *Schistostega pennata*," by The Rev. C. A. Johns, F.L.S. The author concludes that the plant is not itself phosphorescent, and that whatever light was reflected came *not* from the globular cells of the plant, but from the globules of fluid resting upon it. A similar fact was also observed in two species of *Jungermannia*. It appears however to be confined to those Cryptogamic plants with reticulated leaves. Mr. S. P. Woodward exhibited two rhizomas of *Aspidium Filix-mas;* one showing the spiral arrangement of the rachides, and on the other (and on the little pieces accompanying it) buds were developed. Near the bases of some of the rachides which appear in some instances, Mr. W. had seen to produce fronds yearly, till they became rhizomas in their turn, an inch or two long. This mode of development is common in Foreign genera, but Mr. W. was not aware of its having been mentioned as occurring in any of the British ferns.—*G. E. D.*